

# इंटरनेट

# मानक

## Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 8261-4 (1998): Pins and wires skeletal traction, Part 4: Material and mechanical requirements [MHD 2: Orthopaedic Instruments, Implants and Accessories]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



IS 8261 ( Part 4 ) : 1998

ISO 5838-1 : 1995

भारतीय मानक  
स्कैलटल संकर्षण हेतु पिन व तारें

भाग 4 सामग्री तथा यांत्रिक अपेक्षाएँ

( पहला पुनरीक्षण )

*Indian Standard*  
**PINS AND WIRES SKELETAL TRACTION**  
**PART 4 MATERIAL AND MECHANICAL REQUIREMENTS**  
*( First Revision )*

ICS 11.040.40

© BIS 1998

**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

July 1998

Price Group 1

## NATIONAL FOREWORD

This Indian Standard ( Part 4 ) ( First Revision ) which is identical with ISO 5838-1 : 1995 'Implants for surgery — Skeletal pins and wires — Part 1 : Material and mechanical requirements', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Orthopaedic Instruments and Accessories Sectional Committee and approval of the Medical Equipment and Hospital Planning Division Council.

This standard was first published in 1984 as dual number standard. Its first revision has been issued to incorporate the modifications effected in the second edition of ISO 5838-1 brought out in 1995. In this revised version a complete set of raw materials has been replaced with the old one and their mechanical properties, that is, ultimate tensile strength and elongation, etc, have been redefined. The related new ISO standards for these materials have also been included in the normative reference clause.

The text of above mentioned ISO standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following :

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma ( , ) has been used as a decimal marker while in Indian Standards, the current practice is to use a point ( . ) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated :

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 5832-1 : 1987	IS 5347 ( Part 2 ) : 1993 Requirements for orthopaedic implants : Part 2 Wrought stainless steel ( <i>first revision</i> )	Identical
ISO 5832-2 : 1993	IS 5347 ( Part 3 ) : 1996 Requirements for orthopaedic implants : Part 3 Unalloyed titanium ( <i>first revision</i> )	do
ISO 5832-3 : 1990	IS 5347 ( Part 4 ) : 1996 Requirements for orthopaedic implants : Part 4 Wrought titanium 6-aluminium 4-vanadium alloy ( <i>first revision</i> )	do
ISO 5832-5 : 1993	IS 5347 ( Part 6 ) : 1996 Requirements for orthopaedic implants : Part 6 Wrought cobalt-chromium-tungsten-nickel alloy	do

( Continued on third cover )

*Indian Standard*  
**PINS AND WIRES SKELETAL TRACTION**  
**PART 4 MATERIAL AND MECHANICAL REQUIREMENTS**  
*( First Revision )*

## 1 Scope

This part of ISO 5838 specifies materials and mechanical requirements for skeletal pins and wires for use in bone surgery, excluding wires for binding and twisting.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 5838. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 5838 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5832-1:1987, *Implants for surgery — Metallic materials — Part 1: Wrought stainless steel.*

ISO 5832-2:1993, *Implants for surgery — Metallic materials — Part 2: Unalloyed titanium.*

ISO 5832-3:—<sup>1)</sup>, *Implants for surgery — Metallic materials — Part 3: Wrought titanium 6-aluminium 4-vanadium alloy.*

ISO 5832-5:1993, *Implants for surgery — Metallic materials — Part 5: Wrought cobalt-chromium-tungsten-nickel alloy.*

ISO 5832-6:1980, *Implants for surgery — Metallic materials — Part 6: Wrought cobalt-nickel-chromium-molybdenum alloy.*

ISO 5832-7:1994, *Implants for surgery — Metallic materials — Part 7: Forgeable and cold-formed cobalt-chromium-nickel-molybdenum-iron alloy.*

ISO 5832-8:—<sup>2)</sup>, *Implants for surgery — Metallic materials — Part 8: Wrought cobalt-nickel-chromium-molybdenum-tungsten-iron alloy.*

ISO 5832-11:1994, *Implants for surgery — Metallic materials — Part 11: Wrought titanium 6-aluminium 7-niobium alloy.*

ISO 6892:1984, *Metallic materials — Tensile testing.*

## 3 Material

Skeletal pins and wires shall be made of wrought materials in accordance with the appropriate parts of ISO 5832 (see clause 2).

1) To be published. (Revision of ISO 5832-3:1990)

2) To be published. (Revision of ISO 5832-8:1987)

4 Mechanical properties

The mechanical properties, determined as specified in clause 5, shall be in accordance with the requirements given in table 1.

5 Test methods

The test methods to be used in determining compliance with the requirements of this part of ISO 5838 shall be in accordance with ISO 6892.

Table 1 — Mechanical properties

Type of material	Diameter	Ultimate tensile strength	Elongation <sup>1)</sup>
	<i>d</i> min. mm	min. MPa	min. %
Wrought stainless steel	1 < <i>d</i> ≤ 2,8	1 240	3
	2,8 < <i>d</i> ≤ 4	1 100	5
	4 < <i>d</i> ≤ 6	960	5
Wrought unalloyed titanium <sup>2)</sup>	≤ 3	730	3
	> 3	750	5
Wrought titanium alloys	≤ 6	1 030	3
Wrought cobalt-chromium base alloy	≤ 6	1 240	7
<p>1) Gauge length = <math>5,65\sqrt{S_0}</math> where <math>S_0</math> is the original cross-sectional area in square millimetres or equal to 50 mm if possible. If this is not possible, for wires smaller in diameter than 2,5 mm, a gauge length of 100 mm or 200 mm, equal to the total length between the grips, may be used (ISO 6892). However, in this case the minimum value of elongation shall be agreed between the interested parties.</p> <p>2) In specific clinical applications, the cross-sectional dimensions of the pin or wire used should correspond to the strength of the material.</p>			

( Continued from second cover )

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 5832-6 : 1980	IS 5347 ( Part 7 ) : 1984 Requirements for orthopaedic implants : Part 7 Wrought cobalt-nickel-chromium- molybdenum alloy	Identical
ISO 5832-7 : 1994	IS 5347 ( Part 8 ) : 1997 Requirements for orthopaedic implants : Part 8 Forgeable and cold-formed cobalt- formed cobalt-chromium-nickel- molybdenum-iron alloy ( <i>first revision</i> )	do
ISO 5832-8 : 1987	IS 5347 ( Part 12 ) : 1993 Requirements for orthopaedic implants : Part 12 Wrought cobalt-nickel-chromium- molybdenum-tungsten-iron alloy	do
ISO 5832-11 : 1994	IS 5347 ( Part 15 ) : 1997 Requirements for orthopaedic implants : Part 15 Wrought titanium 6-aluminium 7- niobium alloy	do
ISO 6892 : 1984	IS 1608 : 1995 Mechanical testing of metals — Tensile testing ( <i>second revision</i> )	Technically Equivalent

This Indian Standard has been issued in four parts. Other parts of this standard are :

- Part 1 Kirschner wires
- Part 2 Guide wires
- Part 3 Pin and wires fixation and threaded

For the purpose of deciding wheather a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.



## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Inquiries relating to copyright be addressed to the Director (Publications), BIS.

### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc : No. MHD 2 ( 2704 ).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002  
Telephones : 323 01 31, 323 94 02, 323 33 75

Telegrams: Manaksanstha  
( Common to  
all offices )

### Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg  
NEW DELHI 110002

### Telephone

{ 323 76 17  
323 38 41

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola  
CALCUTTA 700054

{ 337 84 99, 337 85 61  
337 86 26, 337 86 62

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 38 43  
60 20 25

Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113

{ 235 02 16, 235 04 42  
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)  
MUMBAI 400093

{ 832 92 95, 832 78 58  
832 78 91, 832 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR.  
COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR.  
KANPUR. LUCKNOW. NAGPUR. PATNA. PUNE. THIRUVANANTHAPURAM.